

FOR TEACHERS ONLY

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The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Tuesday, August 17, 2004 — 12:30 to 3:30 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 3 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Visit the site <http://www.emsc.nysed.gov/osa/> and select the link "Latest Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

Part A and Part B-1

Allow 1 credit for each correct answer.

Part A			Part B-1	
1 3	11 2	21 3	31 4	34 3
2 1	12 4	22 3	32 4	35 2
3 1	13 2	23 1	33 1	36 4
4 1	14 3	24 4		
5 3	15 1	25 3		
6 4	16 2	26 2		
7 4	17 3	27 4		
8 2	18 1	28 1		
9 1	19 2	29 4		
10 2	20 4	30 1		

LIVING ENVIRONMENT – *continued*

Follow the procedures below for scoring student answer papers for the Regents Examination in Living Environment. Additional information about scoring is provided in the publication *Information Booklet for Administering and Scoring Regents Examinations in the Sciences*.

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind.

Allow 1 credit for each correct response for multiple-choice questions.

On the detachable answer sheet for Part A and Part B–1, indicate by means of a check mark each incorrect or omitted answer to multiple-choice questions. In the box provided in the upper right corner of the answer sheet, record the number of questions the student answered correctly for each of these parts.

At least two science teachers must participate in the scoring of the Part B–2, Part C, and Part D open-ended questions on a student's paper. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score all the open-ended questions on a student's answer paper.

Students' responses must be scored strictly according to the Scoring Key and Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the rating guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the rating guide. In the student's examination booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

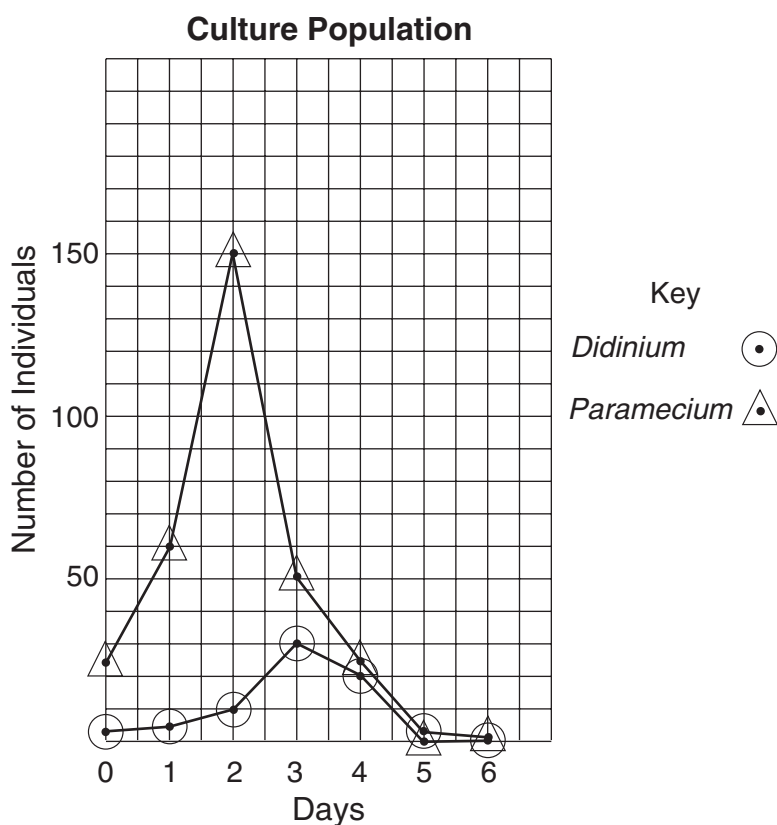
Raters should enter the scores earned for Part A, Part B–1, Part B–2, Part C, and Part D on the appropriate lines in the box printed on the answer sheet and should add these 5 scores and enter the total in the box labeled "Total Raw Score." Then the student's raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Tuesday, August 17, 2004. The student's scaled score should be entered in the box labeled "Final Score" on the student's answer booklet. The scaled score is the student's final examination score.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Because scaled scores corresponding to raw scores in the conversion chart may change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score.

Part B–2

- 37 Allow 1 credit for identifying substance *X* as **oxygen (O₂)** or **glucose (C₆H₁₂O₆)** or **sugar**.
- 38 Allow 1 credit for **chloroplast**.
- 39 Allow 1 credit for **mitochondrion**.
- 40 Allow 1 credit for marking a scale on the axis labeled “Number of Individuals” that is appropriate for the plotted *Didinium* population and for plotting the *Paramecium* population.
- 41 Allow 1 credit for plotting the data for *Paramecium* correctly (based on the student’s axes), surrounding each point with a triangle, and connecting the points.
- Note:** Allow credit only if points are surrounded by a triangle.

Example of a 2-Credit Graph

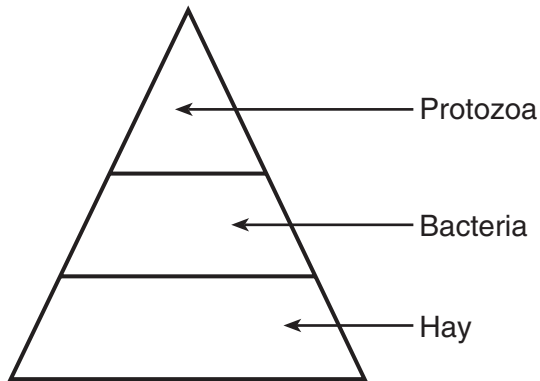
- 42 Allow 1 credit for describing evidence in the data that indicates *Didinium* could be a predator of the *Paramecium*. Acceptable responses include, but are not limited to:
- Changes in the size of the *Didinium* population lag behind changes in the *Paramecium* population.
 - The predator population is usually smaller than the prey population.
 - *Didinium* died out after the *Paramecium*, implying that the *Didinium* ran out of food.

LIVING ENVIRONMENT – *continued*

- 43** Allow a maximum of 2 credits, 1 for each of two possible reasons that the populations died off. Acceptable responses include, but are not limited to:
- They ran out of food.
 - waste buildup
 - disease
 - not enough oxygen
 - no reproduction
- 44** 3
- 45** 2
- 46** Allow 1 credit for stating one economic advantage of bioremediation. Acceptable responses include, but are not limited to:
- Bioremediation is much less expensive than many other methods used to clean up the environment.
 - New businesses can be formed to perform bioremediation.
- 47** Allow 1 credit for describing one biological problem that may possibly result from using microorganisms to fight pollution. Acceptable responses include, but are not limited to:
- Some microorganisms may be harmful to people (or other organisms).
 - Some microorganisms might damage the environment.
 - The introduction of nonnative organisms could upset the balance of an ecosystem.
- 48** Allow a maximum of 3 credits, 1 credit each for identifying and stating the function of each system in the pair chosen and 1 credit for explaining how the systems in the pair chosen work together to maintain homeostasis in an individual. Acceptable responses include, but are not limited to:
- Pair 1 — The muscular system enables an organism to move. The nervous system detects stimuli and sends messages. The muscles receive messages carried by nerves and contract, resulting in movement.
 - Pair 2 — The respiratory system brings in oxygen and the digestive system breaks down food so that both substances are available to cells to make ATP.
 - Pair 3 — The circulatory system carries wastes. The excretory system removes wastes from the blood and excretes them.
- 49** 4

LIVING ENVIRONMENT – *continued*

50 Allow 1 credit for labeling the energy pyramid as shown below.



51 Allow 1 credit for stating whether or not the claim is valid and supporting the answer. Acceptable responses include, but are not limited to:

- The claim is not valid. All species of animals have different chromosomal makeups.
- The claim is not valid because only one experiment was performed.
- The claim is not valid because the results in one species (mice) cannot be used to make generalizations that apply to all animals.
- not valid because different organisms are genetically different

52 Allow 1 credit for indicating that the nuclei of cells in mold *B* are genetically identical to the nuclei of cells in mold *A*.

Part C

- 53** Allow 1 credit for one biological explanation for the changes in types of vegetation observed from A through C. Acceptable responses include, but are not limited to:
- As more soil accumulated (from the decomposition of dead vegetation), plants with deeper root systems could live there and shade out the earlier plants.
 - ecological succession
- 54** Allow 1 credit for identifying one human activity that could be responsible for the change from C to D. Acceptable responses include, but are not limited to:
- cutting the forest
 - clearing the land for crops
 - controlled burn
 - causing forest fires
 - pollution
- 55** Allow a maximum of 2 credits, 1 for predicting what would happen to the soil and 1 for predicting what would happen to the vegetation. Acceptable responses include, but are not limited to:
- The soil depth will increase and trees will be present.
 - The soil will change in composition and the plant species will change.

56 Allow a maximum of 4 credits for discussing the impacts of recycling, allocated as follows:

Allow 1 credit for indicating that recycling is producing new products from old products or putting materials into a new form that is useable.

- Allow 1 credit for one example of a material that is often recycled. Acceptable responses include, but are not limited to:
 - glass
 - metals
 - plastic
 - paper
- Allow 1 credit for stating one specific positive effect recycling has on the environment. Acceptable responses include, but are not limited to:
 - decreased solid waste in landfills
 - energy savings
 - less litter
 - less use of natural resources
 - saves nonrenewable resources
- Allow 1 credit for stating one specific reason that the percentage of solid wastes recycled increased between 1987 and 1997. Acceptable responses include, but are not limited to:
 - easier to participate (more facilities available)
 - enactment of laws
 - community recycling programs
 - public awareness
 - increase in type of recyclable materials
 - economic benefits

Example of a 4-Credit Response

- Recycling involves the use of materials such as glass, plastic, and aluminum cans to produce other products. The trend may be due to the awareness of the need to recycle to improve the environment. Recycling has decreased the amount of solid wastes being dumped into landfills.

57 Allow a maximum of 2 credits, 1 for **glucose or sugar** and 1 for **photosynthesis**.

58 Allow a maximum of 2 credits, 1 for **carbon dioxide** and 1 for **respiration**.

LIVING ENVIRONMENT – *continued*

- 59** Allow 1 credit for stating one way that the shape of the insulin receptor is related to its role in cell communication. Acceptable responses include, but are not limited to:
- The shape of the receptor molecule is specific for a specific molecule.
 - The shape determines what signals (chemical) it can respond to.
 - The shape is specific for the chemical with which it can interact.
- 60** Allow 1 credit for stating the specific effect this genetic error would have on the liver cells. Acceptable responses include, but are not limited to:
- The liver would receive less insulin.
 - It would take more time for a given amount of glucose to enter liver cells.
 - It would affect the ability of the liver to regulate the level of sugar in the blood.
- 61** Allow a maximum of 3 credits for discussing the synthesis of proteins in an animal cell, allocated as follows:
- Allow 1 credit for identifying amino acids as the building blocks required to synthesize these proteins.
 - Allow 1 credit for identifying ribosomes as the sites in the cell where the proteins are assembled.
 - Allow 1 credit for an explanation of the role of DNA in the process of making proteins in the cell. Acceptable responses include, but are not limited to:
 - DNA codes for the amino acid sequence.
 - DNA provides instructions for making proteins.

Part D

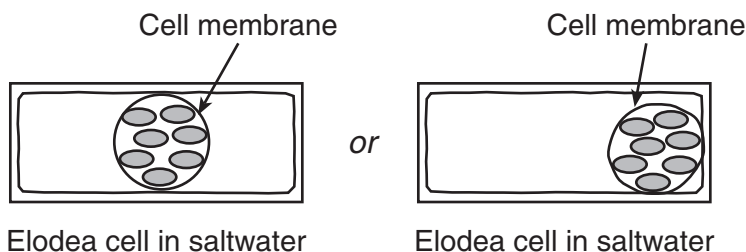
62 Allow 1 credit for stating one way molecules *A* and *B* could differ that would account for the difference in the ability to pass through the cell membrane. Acceptable responses include, but are not limited to:

- Molecule *A* is larger than molecule *B*.
- Molecule *A* is too large to pass through membrane pores.
- One molecule is larger than the other.
- shape
- charge
- solubility

63 Allow 1 credit for indicating that nutrients would move (diffuse) from an area of high concentration of the nutrient to an area of low concentration of that nutrient.

64 Allow a maximum of 2 credits, 1 for showing a cell with shrunken contents and 1 for labeling the cell membrane.

Examples of 2-Credit Responses



Note: The diagram *must* show the cell membrane.

65 Allow 1 credit for indicating that the student used the presence (or absence) of wings to group the organisms.

66 Allow 1 credit for indicating that the earthworm and jellyfish have all (or the most) observed characteristics in common.

67 Allow 1 credit for a biological explanation for the fact that fish and snakes have so many characteristics in common. Acceptable responses include, but are not limited to:

- They may have a common ancestor.
- Both snakes and fish have similar DNA.

LIVING ENVIRONMENT – *continued*

- 68 Allow 1 credit for stating one hypothesis that could be tested using the setups given. Acceptable responses include, but are not limited to:
- Lily plants grow faster at 20°C than at 15°C.
 - Temperature affects plant growth.
 - Lily plants produce more flowers at higher temperatures.

Note: Do *not* accept a hypothesis written in the form of a question.

- 69 Allow 1 credit for describing specific data that should be collected in order to test the hypothesis the student stated in response to question 68. Acceptable responses include, but are not limited to:
- height
 - mass
 - number of leaves
 - number of flowers

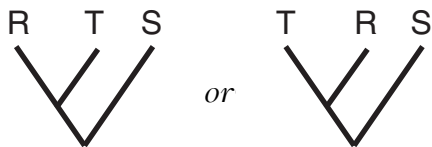
Note: Do *not* allow credit for just “growth” or “appearance” without a reference to the data collected.

- 70 Allow 1 credit for describing one change that could be made in the investigation to improve it. Acceptable responses include, but are not limited to:
- more lily plants in each setup
 - Conduct repeated trials.
 - Increase the sample size.
 - wider range of temperatures

Allow credit for an answer that is consistent with the student’s response to question 68. If the hypothesis includes lilies specifically, then it would not be appropriate to state that using other plants in both setups is a way to improve the experiment.

- 71 Allow 1 credit for placing the letters of the species at the top of the appropriate branches.

Examples of Acceptable Responses



LIVING ENVIRONMENT – *concluded*

72 Allow a maximum of 2 credits, 1 credit for each of two errors in the design of the experiment. Acceptable responses include, but are not limited to:

- no mention of type of data to be collected
- The two groups of mice were not given the same quantity of food and water.
- Equal numbers of males and females should receive the same doses of ibuprofen.
- no control group
- Treatment groups should contain equal numbers of males and females.
- no hypothesis stated
- more than one variable

Regents Examination in Living Environment

August 2004

**Chart for Converting Total Test Raw Scores to
Final Examination Scores (Scaled Scores)**

The *Chart for Determining the Final Examination Score for the August 2004 Regents Examination in Living Environment*, normally located on this page, will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Tuesday, August 17, 2004. Conversion charts provided for previous administrations of the Regents Examination in Living Environment must NOT be used to determine students' final scores for this administration.

Map to Core Curriculum

August 2004 Living Environment

Standards	Question Numbers			
	Part A 1–30	Part B–1 31–36	Part B–2 37–52	Part C 53–61
Standard 1 — Analysis, Inquiry and Design				
Key Idea 1	1	31,32,33		
Key Idea 2				
Key Idea 3			40,41,42,43, 44,45,46,51	
Appendix A (Laboratory Checklist)				
Standard 4				
Key Idea 1	2,3,5,6	36	37,38,39,48	
Key Idea 2	4,7,8,9,12,13		52	61
Key Idea 3	10,14,15,24	34		
Key Idea 4	11,16,25,28, 30			
Key Idea 5	17,19	35		57,58,59,60
Key Idea 6	20,21,22		49,50	53,54,55
Key Idea 7	18,23,26,27, 29		47	56

Part D 62-72	
Lab 1	65,66,67,71
Lab 2	68,69,70,72
Lab 5	62,63,64

